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AMERICAN NURSERYMAN

Chief Exponent of the American Nursery Trade

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AMERICAN NURSERYMAN

Chief Exponent of the Nursery Trade

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EDITORIAL communications on subjects connected with nurseries, arboriculture or other phases of commercial horticulture are welcomed by the editor. Also articles on the subjects and papers prepared for conventions of nursery associations.

The Mirror of the Trade

SEEK THE NEWER ITEMS.

Speakers at several recent conventions of nurserymen have voiced criticism of the lack of originality shown in the ornamental plants offered by the trade. One hazarded the opinion that all nurserymen must have planted from the same blue print. Another expressed the view that nurserymen sought to sell what they had in their fields, rather than attempting to find plants particularly suited for a customer's purpose.

Reference to the catalogues of the leading nurseries would show how many are the newer items available, and scrutiny of the stock in the nursery rows would reveal the considerable assortment there. But there are many enough nurseries, particularly of the smaller size, which offer but a limited selection of popular items to give grounds for the criticism made.

The nurseryman who seeks a clientele which will order of him in bad times as well as good does well to have his stock composed of the items of greatest interest, meaning the better and newer varieties of plants. Let the so-called farmer nurseryman grow the ordinary and common material and take the brunt in time of glut.

The vast numbers of plants in commerce, or being tried out in arboreta or advanced amateurs' gardens, afford abundant novelties. One of the objects of this magazine is to point out to readers some of these things, from issue to issue, and some very valuable articles have appeared in recent issues of just this type. It is not enough to read of such plants, however. Try out those likely to be useful in your locality. Stock them, even if only small quantities at first. You will be rewarded by increased patronage on the part of the buyers who are sufficiently interested in new things to dig down in their pockets for a good price.

THE MARKETING AGREEMENT.

Without news from Washington, or indeed any development since the hearing at the time of the A. A. N. convention at New York, the status of the national marketing agreement remains a topic of debate, rather than action. The reports in the daily newspapers reflect the uncertain prospects of the A. A. A., as well as the N. R. A. What the outcome will be is yet in the dark, and on it depend the form and prospect of such agreements and codes as have not yet been signed.

In the meantime, the subject is not one to be dismissed, but rather given fuller consideration by nurserymen, many of whom have deferred informing themselves on this topic. W. C. Griffing, prominent figure in the trade in Texas, finds the results of the southwestern cooperative marketing agreement so favorable that he speaks in behalf of the national agreement on a later page of this issue. Other comments on the subject will be welcome for inclusion in these columns.

SHADE TREE CONFERENCE.

The annual conference on shade trees draws few nurserymen, the attendance consisting chiefly of scientists engaged in federal or state work controlling diseases and insects affecting these trees, and of practical men engaged in tree maintenance and repair. The two days' program is packed full of lectures and discussions, which contain a great amount of information as valuable to nurserymen growing shade trees as to the persons who attend the conference in greater numbers. Hence, considerable space is given in this issue to a report of some of the important features of the conference. Others equally important may seem to have been passed over, but that is because the papers will be presented in full or in summary in later issues of The American Nurseryman. Some of the abstruse scientific papers foreshadow practical application of their subject material, to the benefit of nurserymen and gardeners alike. So it is worth while to give these subjects study, not only for the purpose of being posted on topics related to one's calling, but also for the knowledge to be derived useful in current nursery practice.

PARASITES CURB FRUIT MOTH.

Twelve million minute, dark, gnat-like insects called trichogramma were liberated during May, June and July this year, in the campaign of the state department of agriculture against the oriental fruit moth in Pennsylvania.

Because of the unusual life history of the fruit moth, sprays have been found ineffective in control. For that reason Pennsylvania has been concentrating its efforts in recent years on the artificial rearing of parasites by the millions, hoping to curb the menace of this insect.

The oriental fruit moth is an extremely destructive insect. It mutilates peach trees by destroying terminal buds and likewise causes wormy peaches.

Work with parasites as a control was started by the state six years ago. One difficulty after another was encountered due to the many complications of securing a satisfactory host for winter rearing the trichogramma in order greatly to multiply its numbers for release in the spring. It was found eventually that bagworm eggs provided a very satisfactory host for rearing the parasites. Millions of these eggs have been collected.

State officials gain satisfaction from reports which indicate that the fruit moth has been somewhat less severe in most localities this year than for some time. To what extent the decreasing ravages of this insect can be credited to the work of parasites is not known, but the entomologists believe it is an important factor.

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AMERICAN NURSERYMAN

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The Chief Exponent of the American Nursery Trade

The Nurseryman's Forte:
To Make America More Beautiful and Fruitful

Vol. LX SEPTEMBER 15, 1934 No. 6

National Shade Tree Conference

Discussions and Papers of Arborists and Scientists at Pittsburgh Meeting Contain Much Information of Interest to Nurserymen

The tenth national shade tree conference, at Carnegie Institute, Pittsburgh, Pa., August 30 and 31, was attended by 130 arborists and scientists of different institutions from Boston, on the east, to St. Louis, on the west. Two other organizations, meeting jointly with the conference, did much to promote its success. These were the American Society of Arborists and the National Association of Arborists. Both these organizations are made up entirely of men who are practicing some form of arboriculture, though they are not open to nurserymen. The American Society of Arborists is the professional organization, made up of a select few who are able to meet rigid professional requirements, and, in shade tree work, is comparable with the American Society of Landscape Architects in landscape work.

Both the National Association of Arborists and American Society of Arborists went on record as favoring more federal and state appropriations for the control of the Dutch elm disease, more legislation regarding license laws for tree workers and the agreement of certain labor problems. The National Association of Arborists launched a membership drive and the installation of new local chapters.

There were demonstrations of spraying outfits in Schenley park, at the rear of the Carnegie Institute, by the Hardie Mfg. Co., Hudson, Mich.; John Bean Mfg. Co., Lansing, Mich., and Friend Mfg. Co., Gasport, N. Y. The Howard Tree Research Laboratories, Warren, Pa., gave demonstrations of cutting out cavities and tree fertilizing, using compressed air for the operation of all tools. One auger was electrically driven.

The Danbury-Eagleson Co., Grandview, Mo., sent a tree mover, which moved an 8-inch American elm, to the satisfaction of everyone.

Other companies with exhibits were the Jackson & Perkins Co., Newark, N. Y.; H. K. Porter, Inc., Everett, Mass., cutting tools; A. M. Leonard & Son, Piqua, O., cutting tools; Bartlett Mfg. Co., Detroit, Mich., saws, etc.; Sun Oil Co., Philadelphia, and Peat Import Corp., New York.

Dutch Elm Disease.

Every arborist and nurseryman present was vitally interested in the future of the Dutch elm disease in this country. Strangely enough, the authorities present would say nothing of its future, but had plenty to say about its past.

Dr. O. N. Liming, of the United States Department of Agriculture, said that each year the disease has increased sixfold in this country. It apparently spreads fastest in those sections where there are diseased trees and bark beetles present. It is still confined to the general region around southeastern New York and northern New Jersey. However, in this same connection, a map of Europe was shown and the spread there plotted. The disease spread at varying speeds over a 5-year period, but in some directions exceeded 500 miles in this time. One of the curious things was that, though Denmark is near Holland, where the disease was originally discovered, there is some agent apparently at work keeping it out. Whether this may be due to weather or some other factor is hard to say.

Dr. Liming is primarily interested in the actual eradication of the disease. Unfortunately, stumps are not removed so much as they should be, for it has been shown that sprouts coming from diseased stumps may act as agents in the further spread of the disease. All tools are sterilized in the eradication work. The cost of removing trees rests entirely on state and local governments. The federal government is supporting the scouting.

The costs for removing a tree vary greatly, one tree costing as much as $160. However, the average cost is $18.25, of which $12 is spent in the actual cutting down and $6.25 in the hauling away and burning. To remove the stump would cost about $8 more, one of the reasons why this is not done. The bark on the stump is removed six inches below the ground and the whole stump then is treated with creosote.

Only once, this spring, has eradication caught up with scouting. Now there are about 3,000 trees standing which are known to be diseased, but which have not yet been removed. These trees constitute a serious menace in the spreading of the disease. It was urged that everything be done to get sufficient funds to remove these trees at once. The number of known infected trees found to date is interesting. In New York 734 have been removed and 1,108 are standing, while in New Jersey 2,735 have been removed and 1,806 are standing.

Dr. Curtis May, in charge of the laboratories at Moorestown, N. J., said that definite identification of the fungus can be made thirty or forty hours after specimens are received at the laboratories, but that it is safer to wait about three days. Between June 26 and August 18, 8,763 specimens were cultured in the laboratories. He said that they want more specimens, particularly from supposedly infected trees outside the area.

Dr. Curtis May read the paper entitled "Advances in Our Knowledge of the Dutch Elm Disease," contributed by R. Kent Beattie, pathologist in the bureau of plant industry of the United States Department of Agriculture.

A talk on elm diseases in Illinois, illustrated by lantern slides, was given by Dr. L. R. Tehon, of the Illinois state natural history survey. Excessive losses incurred by nurserymen in Illinois led to an investigation of elm and shade tree diseases, now being carried on under Dr. Tehon's direction.

Cosmic Rays and Shade Trees.

Captain Ernest Gonzenbach, Louisville, Ky., said that he has made an avocation of studying cosmic rays, particularly in regard to shade trees. Though this is a new subject, and little is definitely known about cosmic rays, particularly by the layman, some of Captain Gonzenbach's remarks may prove interesting, though they must be taken at their face value.

The earth and even living bodies are giving off cosmic rays, similar to those given off by heavenly bodies. These earth rays may be deflected by good conductors such as deposits of metal or water; otherwise they come out of the earth as ribbons or narrow bands. Electric waves have sixty oscillations per second, radio waves 50 billion oscillations per second and cosmic waves 500 quintillion.

Earth rays are the cause of human cancer and canker in trees, he said. (Just about this time many of the visitors began to shake their heads doubtfully.) He went into this further by stating that the Chinese knew of these rays 4,000 years ago. In selecting a site for a house they would never choose a place where there were "devil

demons;" in other words, where the old-fashioned willow "witch stick" pointed down when it was held in the hands of the correct operator. As a result of this, the Chinese cancer rate today is fifteen per 100,000 while in America, where houses are not located in this way, the cancer rate is 75 to 100 per 100,000. The "witch stick," he claims, will turn down at rays emanating from the earth, when correctly operated.

Another interesting point is that the Germans have established the fact that lightning only strikes the earth where two earth rays cross each other, and in 200 observations personally made in this country, this has proved to be the case.

By this time the number of skeptics was increasing, and the captain decided that it was time for actual proof of these rays. He took a willow-forked stick and walked slowly toward a tree which was ostensibly leaning away from an earth ray. Sure enough, the stick turned toward the ground. This was an interesting sight, to see a hundred intelligent adults, many of whom were scientists in their own right, following carefully every operation of this "witch stick." And not only that, but several of the most learned of the group lingered long and painfully repeated the operation themselves. Though many tried it, it worked for only a few, and these, the captain claimed, had the correct rays in their own bodies. At the end of this demonstration the skeptics outnumbered those who believed what they saw.

Slime Flux of Elms.

Dr. E. F. Guba, plant pathologist of the Massachusetts experiment station, has made an extensive study of slime flux in elms. He has devoted much time to studying literature in foreign languages and has made many observations in this country. Slime flux is not a transmissible disease, according to Dr. Guba, but is the result, usually under an old wound, of an extremely high sap pressure which forces a slimy liquid out through the wound.

This is best controlled by relieving the pressure below the wound. It is best first to cauterize the wound, fill it if necessary and then paint with a good waterproof paint. Then a slanting hole is bored about six inches below the wound, up into the center of the heartwood. Then a brass pipe of ¾-inch or 1-inch diameter is plugged in this hole with the end in the tree about an inch beyond the sapwood, but not reaching the entire length of the hole. This materially reduces sap pressure at the right place, and if this is correctly done, troubles occurring from slime flux will be at a minimum.

Shade Tree Fertilization.

Donald Wyman, of Cornell University, described the Cornell shade tree experiments, which have been running for four years.

A. P. Beilmann, arborist at the Missouri Botanical Garden, had experiments to report in which he fed trees amounts of fertilizer larger than has ever been reported. This was applied in holes, about thirty inches below the surface of the ground, and then a stream of water was forcibly applied, making at least half of the fertilizer readily available.

After trials of many fertilizer mixtures, a 10-8-6 has been selected as being the best suited for general purposes. The method used for determining the amount of fertilizer to add per tree was to add to the height, in feet, the diameter of branch spread, in feet, and the trunk circumference, in inches. The resulting figure was the number of pounds of a 10-8-6 to add.

Another example of heavy feeding was the addition of twenty-five pounds of a readily available 15-30-15 to a walnut tree only one and one-quarter inches in diameter. He went on to state that shade trees cannot be overfed, a statement to which many present chose to take exception.

In selecting a 10-8-6 as the best mixture to use in feeding trees, Mr. Beilmann fed some trees a different mixture each year. The last year records were taken, the growth was the greatest and he, therefore, concluded that the mixture (10-8-6) applied that year was the best and most logical to use. Unfortunately, few, if any, check trees were used in these experiments and no check was made on trees to determine what effect the application of water alone had on tree growth.

Smoke Injury.

Dr. O. E. Jennings, of the botany department of the University of Pittsburgh, described how smoke injures trees by clogging up the stomates in the leaves and thus limiting the intake of carbon dioxide, a gas necessary in food manufacture. Since Pittsburgh is known as the Smoky city, Dr. Jennings is well situated to make his studies. He has listed the following trees in the order of their resistance to smoke in the city: Ailanthus glandulosa, Ginkgo biloba, Populus nigra italica, Quercus palustris, Platanus orientalis, Liquidambar Styraciflua, Acer platanoides, Tilia vulgaris.

Control of Shade Tree Insects.

Dr. E. P. Felt, head of the Bartlett Tree Research Laboratories, is well qualified to issue statements on insect control. He reviewed many, some of the more important being:

1. Know your insect, its life habits, where and when it feeds.
2. Is it a borer, a sucking insect or a biting insect?
3. Know your sprays. It has been found quite costly to spray with lime sulphur near buildings.
4. Forestall injury. An ounce of prevention is worth a pound of cure.
5. Is the insect equally destructive all over, or is it more injurious in the shade than in the sun? Does it do more damage in wet or dry weather?
6. Be able correctly to evaluate these and other problems. Keep records, do as much research as you can and keep up in your reading on various control investigations being carried out elsewhere.

A. F. Burgess, in charge of gypsy and brown-tail moth control of the bureau of entomology and plant quarantine of the United States Department of Agriculture, was unable to be present, but sent a detailed report of the gypsy moth situation in Pennsylvania, describing the control measures taken there.

Dr. C. C. Hamilton, associate entomologist of the New Jersey agricultural experiment station, contributed a paper on borer control experiments.

Dr. L. C. Chadwick, of the department of horticulture of Ohio State University, contributed an interesting article on "Soil Acidity and Plant Growth," which appears on another page of this issue.

O. M. Wood, of the Allegheny forest experiment station of the United States Department of Agriculture, located at Philadelphia, described studies made on the root system of chestnut oak, illustrating his talk with lantern slides.

A paper prepared by Dr. Haven Metcalf, pathologist of the United States Department of Agriculture, on "Plant and Shade Tree Welfare," was presented by R. P. Marshall. Norman Armstrong discussed "Tree Work in the South." K. D. Doak discussed "Mycorrhizæ and Their Relation to Shade Trees."

Two important points were brought out by discussion. One was that the majority of those present agreed with Dr. J. S. Houser, of the Ohio experiment station, from past experiences, that it is safer to use dormant oil sprays on shade trees in the spring, rather than in the fall.

The other point was that, in an effort to prevent Dutch elm disease injury, it is best to start a cleaning-up campaign in which all sick or dying trees are removed and all dead limbs are taken off. Everything should be done to aid the tree in growing normally.

Cognizance was taken of the fact that a western shade tree conference has met out on the Pacific coast. Its proceedings have been published. It is hoped that some time in the future, it may be possible for this organization to meet jointly with the national shade tree conference.

Business Meetings.

Various matters of business were promptly taken care of. The majority of those present indicated that they would like to have a 3-day conference next year instead of two days. Officers elected for the coming year are: President, Dr. R. P. Marshall, Yale University; vice-president, Dr. C. C. Hamilton, New Jersey experiment station; secretary-treasurer, Dr. R. P. White, New Jersey experiment station.

The National Association of Arborists elected the following: President, C. F. Irish, Cleveland; vice-president, O. W. Spicer, Bartlett Tree Expert Co., Stamford, Conn.; secretary-treasurer, Norman Armstrong, White Plains, N. Y.

The National Arborists Association elected the following: President, W. G. Aborn, Bartlett Tree Expert Co., Providence, R. I.; vice-president, A. F. W. Vick, Chestnut Hill, Philadelphia; secretary-treasurer, H. Vaughn-Eames, 1703 Lefcourt building, Newark, N. J.

TO REMOVE DEAD FRUIT TREES.

Work to remove dead and decaying fruit trees, estimated at 500,000, from New York orchards has been announced by the extension service through Director L. R. Simons, of the state college of agriculture. The work is to be conducted as community welfare and rural rehabilitation, through individual counties. The extension service has long realized the menace of these old trees, but farmers could not stand the expense of removing them without aid. Mr. Simons pointed out that such trees may easily become a prey to the shot-hole borer and to fungous diseases which cause wood rot and cankers and that these trees would help spread these troubles to healthy trees.

Soil Acidity and Plant Growth

Tests on Solubility of Plant Nutrients under Varying pH Readings Told to Arborists at Pittsburgh Conference by L. C. Chadwick

The study of soil acidity is comparatively new, and but few subjects have gained as widespread attention from investigators during the past ten or twelve years. Possibly overenthusiastic, scientists seemed to have the tendency of trying to explain most soil reactions and the behavior of plant growth on the basis of the hydrogen-ion concentration of the soil, but much valuable information has been obtained which has broadened our understanding of problems of plant growth.

There is a tendency at the present time to consider hydrogen-ion concentration as only one of the important factors of plant growth. It is not a cure-all explanation of all plant growth phenomena, as one might be led to think from various publications. Other influential factors, such as the colloidal nature of the soil, the biological activity therein and various other aspects, exert their influence.

Grower Can Test Soil.

Not so long ago when growers sent samples of soil for analysis, tests were made for acidity alone and recommendations were made accordingly. This was at least in part due to the fact that the grower had been led to believe that the reaction of the soil alone was the all-important factor determining the growth of his plants. Analysis tests at the present time go much further. The so-called essential elements —nitrogen, phosphorus and potash— are determined. In many cases, even some of the minor elements, such as aluminum, calcium, chlorine and sulphur, are determined. The content of organic matter is noted, and with all of these conditions in mind, fairly accurate recommendations can be given. Many of these tests can be made in the field with fairly reliable results; laboratory determinations may be substituted or made in addition, if necessity demands.

As an indication that hydrogen-ion concentration of the soil alone is being given less emphasis and that a broader aspect is being considered, recent investigations conducted by the soils department at Ohio State University, Columbus, have led to a new conception of plant growth in relation to soil factors which they denote as oxidation-reduction potential. Simply, this oxidation-reduction, or redox potential, as it is called, is the resultant of the determination of such combined factors as the air-water content of the soil, which in turn gives an indication of the activities of microörganisms, and the extent of the oxidation or reduction of such soil constituents as carbon, nitrogen, sulphur, iron and manganese. It is felt by these investigators that when hydrogen-ion determinations accompany tests of the redox potential the resultant information will indicate fairly accurately what may be expected from a given soil.

Definitions of Terms.

Before offering some data of the influence of soil acidity on plant growth, it may be well to elucidate briefly some of the terms used in discussing this subject. Soil acidity is a condition where the basic elements, such as calcium, magnesium, sodium and potassium, become soluble and are leached away or absorbed by the plants, leaving behind the iron, silicon and aluminum with which they were combined. Acids of these elements, when dissolved in water, become dissociated. Positive hydrogen ions result from the reaction. The greater the number of these hydrogen ions in a given volume of solution or, in other words, the greater the hydrogen-ion concentration, the more intense is the acid reaction of the solution.

Hydrogen-ion concentration is expressed in terms of pH, a numerical expression which denotes the logarithm of its reciprocal. An acidity-alkalinity scale can be arranged in terms of hydrogen-ion concentration with the numerical value of pH 7 representing a neutral reaction. Any pH number from 0 to 7 indicates an acid solution, with decreasing acidity as the number increases. Any pH number between 7 and 14 indicates an alkaline solution, with increasing alkalinity as the number increases. The true value of the pH reading is rather hard to visualize, since the hydrogen-ion concentration of pH 5 is ten times as great as that of pH 6.

Influence of Acidity on Nutrients.

Much of the work with soil acidity had dealt with its influence upon the availability of the various nutrient elements. It should be understood that acidity is not the only condition of the soil that regulates the availability of nutrient elements; thus different investigators disagree on the reactions occurring. I shall discuss briefly the solubility of the different elements as shown by recent experiments.

Aluminum is highly soluble at pH 4.0, drops rapidly as it approaches pH 5.0 and is negligible thereafter. Curiously enough, however, it becomes soluble at about pH 7.6 and increases rather rapidly above pH 9.0. Oftentimes the thought is expressed that aluminum may become toxic to plants when used as an acidifying agent. There is little likelihood of this under most conditions. Since aluminum is not or only slightly soluble between pH 5.0 to 8.0, no damage may be expected within this range. Experiments have also shown that ample quantities of available phosphorus will reduce possible injury from aluminum.

Calcium is slightly soluble at pH 4.0, 5.0 and 6.0, but then increases rapidly at pH 7.5 to 8.0, reaching a maximum at about pH 8.2. The availability of iron depends upon the nature of the salt. Ferrous salts are available at pH's lower than 6.7, while ferric salts are readily available only at pH's lower than 4.6. Thus the curve given for iron hardly fits either salt, but might be taken to correspond to an average condition. Manganese is readily available at pH's lower than 6.5. Some believe that its maximum solubility is at pH 5.8 to 6.0, others at about pH 4.5 to pH 5.0.

Nitrogen Absorption.

Considerable difference exists concerning the relative absorption of nitrogen. From recent work conducted at the New Jersey experiment station, this would seem to depend upon the hydrogen-ion concentration, availability of carbohydrates and the rate of assimilation within the plants. The results of these experiments indicate that the nitrate ion was assimilated most satisfactorily in the plants used when absorbed from a nutrient solution of approximately pH 4.0. The ammonium ion was assimilated most satisfactorily when absorbed from a nutrient solution having a constant pH value of 5.0 to 6.5.

Plants growing on soils containing both ammonium and nitrate salts absorbed both. The assimilation of them depended somewhat upon the pH of the soil. With soil of pH 4.0, plants accumulated ammonium and assimilated nitrate ions. In neutral or slightly alkaline soils, plants accumulated nitrate ions and assimilated ammonium. A large amount of available carbohydrates favored the ammonium assimilation. A realization of this difference in assimilation of nitrate and ammonium salts is an aid in explaining favorable fertilization practices with ericaceous plants. Here nitrogen supplied in a slowly available form of ammonia is most satisfactory.

Phosphorus and Potassium.

Phosphorus is apparently quite highly available at pH 3.5, is less at pH 4.0 and 5.0, then increases at pH 6.0 to 6.5, followed by a rapid drop to pH 8.0. The solubility of potassium decreases steadily from pH 4.5 to 8.0.

Considering the elements as a group, the striking fact is that an acid reaction is necessary for adequate solubility of all except calcium and possibly potassium and aluminum. From a chart showing reactions, it would seem that a reaction of the soil between pH 5.5 and 6.5 is the most favorable to maintain. For those plants that seem to require active aluminum, it would be well to make the soil more acid.

Plant Tests.

Tests on soil acidity and plant growth at Ohio State University have dealt with comparatively few plants other than herbaceous plants and bulbs. Among those which have been grown under controlled conditions include Daphne Cneorum, Iris germanica, Delphinium ajacis, Lupinus polyphyllus, Lupinus Hartwegii, tulips, narcissi, Lilium regale, L. speciosum and L. longiflorum.

Rhizomes of the two German iris varieties were planted September 1, 1930, in plots adjusted at half-point intervals between pH 4.5 and 8.0. Each plot was prepared with Canfield silt loam (pH 5.0), with which was incorporated a

one-inch layer of German peat (pH 3.5). The peat was added to increase the humus content and improve the general texture of the soil. Increments of aluminum sulphate or hydrated lime were added to the plots until the desired reaction was obtained. Biweekly tests, either by the LaMotte method or electrometrically, were made. The results were recorded July 22, 1932.

A similar test was conducted with Lupinus Hartwegii and Delphinium ajacis. Seeds were sown in each plot November 1, 1931. The final results were recorded on May 5, 1932.

Tests in Greenhouse.

Tests with Daphne Cneorum and Lupinus polyphyllus were conducted under different conditions. A 50-foot greenhouse bench was divided into two sections of five plots each. Ten plants of each were planted in each plot. One section contained a good compost soil and the other a mixture of equal parts by volume of this compost soil and Michigan peat moss. The plots were adjusted at unit intervals from pH 4.0 to 8.0.

The iris plant showed no appreciable differences until about January 1, 1931. At that time plots showing pH's of 7.0, 7.5 and 8.0 showed better foliage color and larger leaves. In plots with a pH reaction of 4.5 and 5.0 the growth was stunted and tip burning of the leaves was prevalent. Plots with reactions of pH 5.5, 6.0 and 6.5 were increasingly better in the order given. During the following eighteen months there was a gradual widening of the growth behavior between plots showing a reaction of pH 4.0 and pH 8.0, those in the highly acid soil being practically worthless. The data recorded show that for the iris varieties in question and under the conditions of this experiment, a neutral or alkaline soil is desirable.

Germination Results.

Lupinus Hartwegii germinated and gave good growth in plots with reactions from pH 5.0 to 8.0 inclusive. Those in which the reaction was neutral or alkaline gave somewhat the best germination and stem length. None of the seeds germinated at pH 4.5.

Delphinium ajacis seeds failed to germinate at pH 4.5 and gave poor germination and growth at pH 5.0. Plots with reactions of pH 5.5 and 6.0 gave only about fifty per cent germination, but satisfactory stem growth. Plots with reactions from pH 6.5 to 8.0 gave good germination and growth. The stem length was slightly superior at pH 6.5 and 7, but germination was slightly lower. These tests show that for the conditions under which they were conducted a neutral or alkaline soil reaction may be considered best for the growth of this delphinium.

With Daphne Cneorum, in both the soil and the soil and peat sections, by far the best growth occurred at pH 7 and 8. The two alkaline plots were slightly the best and were the first to bloom. The other plots were increasingly poorer in the order pH 6.0, 5.0 and 4.0. The plants in plots with reactions of pH 4.0 and 5.0 made little top or root growth.

The growth of Lupinus polyphyllus in the different plots was much the same. A reaction of pH 7.0 gave the best results, followed closely by a reaction of pH 8.0. The others showed poorer results in the order pH 6.0, 5.0 and 4.0. The conclusions that can be drawn from these tests are that both plants make excellent growth in neutral or alkaline soils. A liberal incorporation of peat moss with the soil aids the growth of both plants.

With the bulbous plants mentioned, results of experiments showed that growth was much the best at pH 6.0 to 6.5.

Overcoming Chlorosis.

One of the perplexing problems confronting landscape gardeners and arborists in many sections of the country is the chlorotic condition of the foliage on such plants as pin oak and sweet gum. It would appear from the experimental work that has been done that this chlorosis, or lack of chlorophyll, is due to an unavailable source of iron, or in some cases, zinc. Treatments to overcome this trouble have dealt mainly with such methods as fertilizing with iron salts, spraying with solutions of iron and the injection of iron salts into the tree. These have given variable results in different parts of the country and with different species of plants.

Spraying with iron salts has proved economically feasible in commercial citrus orchards. Injection of these salts into populus species has met with success in some sections. Applying iron to the soil has been highly variable in its results. In few cases has chlorosis been overcome by this method, judging from published reports.

Early in July, some badly chlorotic pin oaks were treated in Columbus, O. The following methods of treatment were used: (a) Sprayed with a five-tenths of one per cent solution of ferrous sulphate ($FeSO_4$, $7H_2O$), (b) fertilized with ferrous sulphate and sulphur at the rate of one-half pound of each to each inch in diameter of the tree, (c) fertilized with ferrous sulphate at the rate of one-half pound per each inch in diameter of the tree, (d) injection of ferrous sulphate into the trunk of the tree. At the end of the first month the only treatment that appeared to have been influential in overcoming any of the chlorotic condition was that in which both ferrous sulphate and sulphur were added. One of these trees showed a marked improvement. Only a few trees were included in these tests and what conclusions can be drawn should not come until next spring.

The influence of hydrogen-ion concentration on the relative solubility of iron forms a basis for explaining the meager results usually obtained by applying ferrous salts to alkaline soils. The application of iron may exert some influence on lowering the reaction, but it is probable that within a relatively short time the conditions are such that iron becomes unavailable. The addition of sulphur with the ferrous salt should create a favorable reaction and a ready absorption of the iron. In highly alkaline soils frequent applications of some acidifying agent will probably be necessary to keep the iron in a soluble form.

Sulphur as Acidifying Agent.

In closing, I should like to present a few figures dealing with the necessary quantities of sulphur to add to soils of various reactions to obtain a definite hydrogen-ion concentration. An experiment was conducted at the Ohio Agricultural experiment station on a Wooster silt loam soil which had been limed at the rate of one ton of ground limestone per acre every year for twenty-six years. The reaction of the soil was pH 7.6 and chemical examination showed that it contained 1,600 pounds per acre of free calcium carbonate. To lower the reaction of this soil as indicated the approximate amount of sulphur required was as follows:

To lower the pH from 7.6 to 7.0 required 2.5 pounds per hundred square feet; 7.6 to 6.0, 4.0 pounds; 7.6 to 5.5, 5.0 pounds; 7.0 to 6.0, 1.5 pounds; 7.0 to 5.5, 2.5 pounds, and 6.0 to 5.5, 1.0 pound.

These quantities should not be taken as being exact for all soils under all conditions; they are simply indicative of approximate amounts necessary to change the reaction of similar soils in a similar way.

BRITISH DUTIES RAISED.

British import duties on trees and shrubs with balled roots, except rose and fruit trees, and trees and shrubs in flower, have been doubled, effective September 1.

The former duty of 10 shillings has been increased to 20 shillings per hundredweight of 112 pounds.

The increased tariff applies on imports from the United States and other countries outside the British Empire. Imports from Empire sources, except the Irish Free State, continue to be admitted duty free.

ON THE CALENDAR.

September 16 to 20, American Institute of Park Executives and American Park Society, annual conventions, Kentucky hotel, Louisville, Ky. Secretary, William Walker, 2234 Inglewood place, South Bend, Ind.

September 20, South Texas Nurserymen's Coöperative Association, Houston, Tex. Secretary, R. H. Bushway, 505 Elgin street, Houston, Tex.

September 22, Idaho State Nurserymen's Association, Melba Nursery, Melba, Idaho. Secretary, E. O. Nord, Box 2526, Boise, Idaho.

September 24 to 27, Association of American Cemetery Superintendents, Brown hotel, Louisville, Ky. Secretary, W. B. Jones, Highwood Cemetery, 2800 Brighton road, N. S. Pittsburgh, Pa.

September 26 to 29, California Association of Nurserymen, annual convention, Long Beach. Secretary, Henry W. Kruckeberg, 230 South San Pedro street, Los Angeles, Cal.

November 15 to 18, Iowa Nurserymen's Association, fourteenth annual convention; during Little Mid-west Horticultural Exposition, Iowa State College. Secretary, R. S. Herrick, State House, Des Moines, Ia.

DOMENIC GARIBALDI, 68 years old, nurseryman of Colma, Cal., died at St. Luke's hospital, San Francisco, Cal., August 29 of injuries suffered August 22, when he fell from a window of his Colma home.

IN A vain effort to save his son, R. Gordon Busteed, 14 years old, who had slipped from the deck of a small motor boat, F. Gordon Busteed, of the Highlands Nursery, Garrison, N. Y., was drowned in the Hudson river, off the estate of President Roosevelt, at Hyde Park, N. Y., September 3.

Meetings of Trade Associations

Important Sectional Groups Gather, Pacific Coast Convention Discussing Marketing, Southern Association Government Activities

SOUTHERNERS' CONVENTION.

At Asheville after Thirty Years.

Returning to Asheville, N. C., for the first time since 1904, members of the Southern Nurserymen's Association met at the George Vanderbilt hotel August 30 and 31 for their thirty-sixth annual convention. The election of new officers occurred the second day, as the result of which W. L. Monroe, Atlanta, Ga., was named president for the ensuing year. Other officers elected were: Vice-president, E. F. Chattin, Winchester, Va.; secretary-treasurer, W. C. Daniels, Charlotte, N. C., and chairman of the executive committee, M. L. Harkey, Charlotte, N. C.

Fred L. Weede, manager of the Asheville chamber of commerce, welcomed the nurserymen to the city. C. T. Smith, Concord, Ga., made the response.

President's Address.

In presenting his president's address, L. M. Jones, Norfolk, Va., pointed out that much of the increase in business during the past year was due to governmental stimulus through roadside improvement, park planting and similar projects. Continuing, he remarked:

"What another year will bring forth I am unable to say, although the prospects for the south are more promising than they have been for the past decade. It appears to me, however, that the ornamental business will not get back to normal until home building is revived. R. G. Dun & Co. show in their reports that general business is on the uplift, and if this continues, the nursery business will ultimately follow, but not so rapidly as other lines.

"The national housing act apparently opens an avenue for increased sales of nursery stock that under present conditions may be called new for the ornamental nurseryman and landscape man, if it is gone after in the right manner. There seems to be a chance for the nurseryman to get in on this phase of government assistance in the repairs and renovation of the home in the same manner as the lumberman, the plumber and the carpenter."

Talk on Blister Rust.

"Blister Rust of White Pines and Its Relation to Nurseries" was the topic of an address by Dr. J. H. Martin, of the bureau of plant industry, Washington, D. C. Stating that trees bearing the rust infection had been found in the Shenandoah National park, in Virginia, Dr. Martin stated that it is imperative to eliminate all varieties of ribes within the area of infection and to follow closely the other methods of control that have been approved.

Much inspiration was gained from the remarks of Vice-president C. O. Kuester of the Charlotte, N. C., chamber of commerce, who touched on many topics relating to the problem of living, speaking in a manner peculiarly his own.

The final talk on the morning program for the first day was on the subject of "Rock Gardens." The speaker was Prof. William Lanier Hunt, Chapel Hill, N. C., who used pictures to illustrate his points and stressed methods for educating southern home owners to a greater appreciation of horticulture.

The entire afternoon September 30 was devoted to a tour of the Biltmore estate of the late George W. Vanderbilt. Highly interesting was the extensive collection of rare and unusual plants to be found in various parts of the grounds. In the evening, a banquet was an enjoyable event.

Government Activities Told.

On the second day, the program was opened with an address on "Activities of the T. V. A.," given by S. F. Brewster, regional planner in charge of parks and recreation in Knoxville, Tenn. This talk conveyed a clear impression of the government's objectives in the south. Of particular interest was the explanation of the recreational development plan. Concerning the power establishments, the speaker said their operation would be valuable in determining fair rates for the product of the public utility companies elsewhere.

Lee McClain, Knoxville, Tenn., told of his experiences in visiting the erosion-control nurseries operated by the United States Department of Agriculture near Knoxville. Production costs at these establishments, he implied, are higher than at private nurseries.

Another address relating to soil erosion problems was given by W. E. Bowers, agronomist, High Point, N. C. The use of cover crops, lespedezas in particular, and trenching and terracing were urged by the speaker, who claimed that the south in many sections loses one inch of topsoil every three to five years.

The status of the national marketing agreement was presented to the membership by Henry B. Chase, Chase, Ala. It will be two months or more before any agreement can become effective, Mr. Chase declared.

The revitalization plans of the A. A. N. as submitted at the recent convention in New York by a special committee were brought up for discussion, directed by Owen G. Wood, Bristol, Va. At the conclusion, a unanimous vote was taken to approve the plans, and a further report was ordered for the next annual meeting.

Members who remained after the adjournment of the convention proper were taken for a drive over the Elk mountain scenic route and to Sunset mountain.

HANNER NORTH CAROLINA CHIEF.

Holding their semiannual meeting at the George Vanderbilt hotel, Asheville, N. C., August 29, the members of the North Carolina Association of Nurserymen elected W. T. Hanner, Julian, president for the ensuing year. Other officers named were: Vice-president, M. L. Harkey, Charlotte, and secretary-treasurer, Dr. R. W. Leiby, Raleigh.

The following were elected to the executive committee: M. E. Throneburg, Hickory; Harry Nettles, Asheville, retiring president; E. I. Tinga, Wilmington, and W. C. Daniels, Charlotte. Selection of the winter meeting date and city was left to the executive committee.

About fifty persons were in attendance at the meeting, which took place the day before the opening of the convention of the Southern Nurserymen's Association in the same place. L. M. Jones, Norfolk, Va., president of the Southern Nurserymen's Association, addressed the Carolina group on "Organization."

Prof. G. M. Bentley, state entomologist of Tennessee and secretary of the Tennessee Nurserymen's Association, and Owen G. Wood, Bristol, Tenn., a past president of the Southern Nurserymen's Association, discussed problems of interest to the group. The state sales tax and the nurserymen's code were among the matters brought up.

PACIFIC COAST CONVENTION.

Officers Elected.

Holding a most successful two-day meeting at the Benjamin Franklin Hotel at Seattle, Wash., September 11 and 12, the Pacific Coast Association of Nurserymen voted to hold the next meeting at Salem, Ore. The following officers were elected: President, Knight Pearcy, Salem, Ore.; vice-president at large, R. H. Hartmann, San Jose, Cal.; executive secretary-treasurer, Walter H. Dimms, Portland, Ore.; state vice-presidents, J. E. Bergthol, California; Ray Simpson, Oregon; H. E. Andrews, Washington; David C. Petrie, Idaho; Richard Layritz, British Columbia; J. J. Porter, Utah.

C. A. Tonneson, Burton, Wash., retiring executive secretary-treasurer, who has filled that office for many years, was made an honorary life member.

Approximately sixty members met for the delayed convention, with a good representation from the states of Washington, Oregon and California. Howard E. Andrews, of Seattle, vice-president for Washington, was acting president. Sessions opened with an invocation by Rev. Ralph McGee. The mayor of Seattle, Charles Smith, welcomed the visitors.

Reports.

After a brief speech by the acting president, the reports of the executive secretary-treasurer, C. A. Tonneson, and the assistant secretary, R. J. Clary, were given. Another hour was devoted to brief reports from the state vice-presidents, Knight Pearcy, Salem, Ore.; J. G. Bacher, Portland, Ore.; H. E. Andrews, for Washington, and Richard Layritz, Victoria, for British Columbia. W. C. Thompson, of Tacoma, reported for the board of trustees; Charles Malmo, Sr., Seattle, for the executive committee; Paul E. Doty, Portland, Ore., for the committee on industrial recovery; Clayton B. Lewis, Portland, Ore., for the committee on education and market development.

J. G. Bacher showed that the fruit tree crop of the Oregon nurseries was short,

while that of eastern nurseries, because of the cold spring and the following drought, must be largely supplemented by shipments from more favorable sections. The better prices now obtaining for the fruit crop had already resulted in an increased demand at better prices. As his own firm specialized in nut trees, this was the only item on which he could furnish definite figures. Whereas the usual Oregon production of nut trees totaled 70,000, this year would find but 20,000 available, with a much decreased production of filbert bushes in spite of the fact that nurserymen cleaned up those items quite generally last year.

Coöperative Marketing.

R. H. Hartmann, of San Jose, Cal., spoke on industrial recovery, telling how California drafted and almost passed a code during 1933, an adverse ruling halting it within twelve hours of ratification. California nurserymen are obtaining prices twenty per cent greater than a year ago, with the business in fruit trees showing the greatest gains. The rose men, through packing roses in cartons for department-store trade, had boosted their business, but the trade in ornamentals did not show so gratifying a percentage of increase. The California trade was much interested in the Washington nursery code, which has now been in successful operation for several months, and wanted more information about its provisions. In the southern state it would probably be necessary to use a zone system rather than a statewide code.

B. A. Mitchell, Orenco, Ore., delivered a paper on selling coöperatively. Following his address, speaking for the Oregon nurserymen, he requested that some Washington men familiar with that state's code help Oregon draft similar control measures.

Mr. Weiss was allotted a few minutes to demonstrate a new sprayer that used a mixing carburetor to discharge a given quantity of spray material into the water jet used on ornamental plantings, all to be controlled at the will of the operator.

Fred Wiggins spoke for the state agricultural director, Walter J. Robinson, on "Why a Nursery Marketing Agreement?" and followed with his own paper talking about the Washington marketing agreement in operation.

To Consider Regional Agreements.

The afternoon session opened with the formation of a committee of three to consider regional marketing agreements for the entire Pacific coast, Fred Wiggins, P. H. Hartmann and Mr. Smith being appointed by the chair.

A planning committee of five was voted to recommend changes in the constitution to enable the society to cope with the new marketing trends and to this Messrs. Hartmann, Wiggins, Albert, McDonald and Eddy were appointed.

M. McDonald delivered a paper on "Suggestion for Organized Selling," which showed where coöperation could be used to minimize a large proportion of the fixed costs of doing business.

Mr. Reynolds, of the inspection division of the state of Washington, gave a paper on "The Significance of Grades in Establishing Values" and showed how to better existing practices within the state. Following his short address he introduced Dr. Glen A. Huber, plant pathologist for western Washington, and Prof. Arthur Hansen. During their addresses they introduced many specimens showing insect and disease injury, with a running fire of comment for control measures. This was easily the most liked feature of the convention, a clinic based on a similar one held by the Northwest Florists' Association earlier in the year.

H. E. Krause, of Spokane, interrupted the speaking program to ask for the latest developments in the proceedings against the Mountain Meadows Nursery, of Monroe, Wash., which was using convict labor to the exclusion of all others. Mr. Krause explained that he had to return to the inland empire before the convention adjourned and had been asked to convey such information to his district. The convention went on record as against such practices, and a vigorous telegraphic protest was sent to Governor Martin.

A get-together dinner was held at 6 p.m., attended by almost all the delegates, and at 8 p.m. they listened to a paper on highway beautification by Mrs. C. W. Stimson, with a running fire of comments by President W. E. Shelor of the state automobile club.

Second Day.

Wednesday morning saw the convention getting off to a delayed start when Miss Weathers, of Western Gardens magazine, was permitted a few moments to address the assembly. She was followed by O. E. Holmdahl, landscape architect, speaking on coöperation between nurserymen and landscape men, during which he sketched the development of Washington's new arboretum and botanical garden in Washington park, Seattle.

Charles Malmo, Sr., followed with a paper on "The Condition of the Nursery Business Today." Theodore Albert delivered a talk on the relationship between amateur and practical nurseries. In this he stressed the growing tendency of garden clubs to pool their orders and buy at wholesale from eastern sources, making it almost impossible for the local nurserymen to sell to their members.

C. B. Lewis introduced a resolution that a highway and parks planting committee be formed to keep in touch with highway construction, seeing that landscaping appropriations be allotted and that the nurserymen be given the opportunity of bidding on this work, instead of the state's digging wild stock for the purpose. This was at once adopted.

Cecil Solly, radio broadcaster, spoke on "Interesting Developments," detailing his experiences with the Puget Sound Land Co. and the help that nursery planting gave in selling repossessed grounds.

M. McDonald presented the recommendations of the planning committee in the form of a constitutional amendment that the executive committee be changed to consist of the trustees plus one member from each state to be elected by the members in that state or region. This was carried.

Mr. Mitchell asked that the assembly go on record as favoring regional or state marketing agreements based on the existing Washington code, which was voted enthusiastically.

It was suggested that Fred Wiggins be sent to the forthcoming California convention at Long Beach, September 27 to 29, to acquaint the nurserymen there with the existing agreement, and this was voted. J. E. E.

OREGON STATE MEETING.

The Oregon Association of Nurserymen held its second annual meeting, at Portland, Ore., September 7, and a large group of members and others interested from all parts of the state attended. Also present were F. A. Wiggins, deputy administrator of the Washington state nurserymen's marketing agreement, and C. A. Tonneson, Tacoma, Wash., secretary-treasurer of the Pacific Coast Association of Nurserymen.

Reports of the past year's activities were presented by the officers and directors, together with recommendations for future plans for the organization, as well as for the industry generally in the state. Full discussion was heard on these reports, the officers being commended for their successful administration during the first year of the association. The treasurer's report showed a healthy financial condition, with a substantial cash reserve. The reports stressed the desirability of keeping stocks within proper limitation, in order to avoid a production surplus, and to maintain quality up to the highest standards. An analysis of the reports showed that nursery stock in Oregon is not in surplus except, perhaps, in some larger sizes, and it is hoped that overplanting and overproduction may be avoided.

An address was given by J. S. Wieman, of the bureau of plant industry of the state department of agriculture, who promised full coöperation of the department with the nurserymen. Mr. Wiggins gave an interesting talk on the Washington state nurserymen's marketing agreement, which has been in force since last April. Mr. Tonneson gave an instructive address and extended a cordial invitation to attend the annual convention of the Pacific Coast Association of Nurserymen, held at Seattle September 11 and 12.

New officers elected were Ralph Johnston, president; Knight Pearcy, vice-president; Walter Dimm, secretary, and Frank Schmidt, treasurer. Directors are J. E. French, representing landscape gardeners; Frank C. Riggs, bulbs; C. B. Hobbs, fruit and shade trees; Wayne McGill, ornamentals; Fred Borsch, perennials and alpines; E. Dering, roses; J. E. Bacher, florists, and Roy Woodruff, nut trees.

MAIL-ORDER MEETING.

September 10, the members of the National Mail-order Nurserymen's Association met at the Whitcomb hotel, St. Joseph, Mich. Eldon Burgess, Galesburg, Mich., president, presided.

This recently organized association includes mail-order nursery firms in Michigan, northern Indiana and Ohio. Discussion of retail prices occupied this session. It was decided to hold another meeting of the group in Chicago October 4. Applications for membership will be received at this time, and efforts will be made to create a clearer understanding in regard to suggested prices for all lines of nursery stock. B. W. Keith, Sawyer, Mich., secretary-treasurer of the organization, stresses the importance of being present. The meetings will be held in the Sherman hotel the day before the opening of the usual fall sessions of the mail-order group of the American Seed Trade Association at Chicago.

Wall Garden Notes

Further Suggestions on Building and Planting Wall Gardens Given by W. A. Toole

The remarks on wall gardens published in a recent issue suggest some further ideas on the subject gained from considerable experience.

The type of wall that is built up against a terrace is the easiest to construct. If the stones are irregular in size and thickness, the bank should be cut away so that the face of the wall can be made more or less smooth and the projections can be cared for at the back. The soil that is cut away can be used to fill in at the back as the wall rises. If the soil is poor, improve it before replacing it at the back of the wall. When the rocks for the wall are somewhere near the same size, one will need only to smooth off the terrace to the angle desired.

There are three important reasons for having the wall face slant backward a trifle if it is more than two feet high. A vertical wall will not get much moisture from rain falling vertically; it is more difficult to erect a vertical wall, and irregularities in construction are more apparent in a vertical wall. Besides quarried stone, one can use rough weathered stone or glacial boulders for the wall, if they are available.

Soil Requirements.

Flat stones must be laid up with enough of a slant back to carry available moisture to the roots of the plants. The soil may be taken from one's garden, if it is of the right texture, but usually it needs some toning up. If the local soil is of a heavy clay type, a mixture of one-third leaf mold, peat moss or other soil high in humus, one-third sand and one-third garden soil, well mixed, will be good. Humus should be added to sandy mediums.

Use the soil liberally between the stones, making sure there are no air pockets. Space the rocks a couple of inches or more apart, to give room for planting, and do not have the joints line up, or the soil will wash out.

If the work is done by a stone mason, his chief idea will be to make a close tight wall, without regard for the needs of the plants. On the other hand, an ordinary workman may better obey instructions, but may be careless in the placing of stones or forcing the dirt into the crevices. Summer planting is possible in a wall garden, especially if potted plants are obtainable.

In large walls, vines, dwarf evergreens and small shrubs may be introduced at the top of the wall, but in general, plants with a trailing or drooping habit are the most satisfactory.

Exposure.

Walls with a western or southern exposure have the hardest time, because they get the extremes of heat in the summer and much alternate freezing and thawing in the winter. Under these conditions, only the hardiest varieties will thrive.

An eastern exposure is perhaps the most ideal for a wide range of varieties. A wall facing north is not too shady for most plants, if the shade cast is only that provided by the wall itself. Many of the sun-loving varieties will thrive even in a northern exposure, and with them can be used ferns, partridgeberry, Vinca minor and many others favoring shade. Dianthus will not flower satisfactorily in the shade.

Clematis tangutica might be mentioned as an especially useful and rare subject to be planted at the top of a rock wall. This yellow-flowering clematis is extremely hardy and won the praise of the late Dr. E. H. Wilson in his book "More Aristocrats of the Garden." The plant grows ten to twelve feet, with grayish green foliage, raggedly cut and lobed. The rich yellow top-shaped long pointed flowers are borne singly on 6-inch stalks. The blooms arise from the leaf axils of the current season's shoots in July and are followed by large feathery heads of fruit of singular beauty. It thrives in good garden soil, with sun or partial shade.

Not the least beautiful of the ferns, too, are some that seek the sun and are at home in the rock or wall garden. Woodsia ilvensis grows on the most exposed sun-baked rocks, but requires acid soil. W. obtusa grows readily on lightly shaded banks or ledges; this is a low-growing variety. Cheilanthes Feei, the lip fern, and Pellæa atropurpurea, purple cliff brake, are also suitable for the limestone wall.

FOR SHADED ROCK GARDEN.

Requests are frequently received by growers for a list of plants for a rock garden under a tree "where nothing seems to grow." It is asking a good deal of any plant to meet such requirements. The following selection of plants, mostly natives, includes, however, subjects that will do well in shade if given a soil of leaf mold and watered during the summer months. The flowers will appear almost entirely during the spring, leaving the ferns to produce most of the ornamental features later in the season:

Aquilegia canadensis	Aquilegia alpina
Cypripedium pubescens	Gentiana Andrewsii
Dicentra eximia	Sanguinaria canadensis
Asarum canadense	Iris cristata
Hepatica acutiloba	Trillium grandiflorum
Campanula rotundifolia	Viola pubescens
Mertensia virginica	Vinca minor
Phlox divaricata	Maidenhair
Polemonium reptans	Lady fern
Primula veris	Evergreen fern

W. A. T.

For Marketing Agreement

W. C. Griffing Thinks It Will Extend Benefits Derived from Southwestern Co-operative

After we have gone through a long, hot summer season, everyone is looking forward to a general revival in business. Many have remarked about the drought area, in which many trees and shrubs have been damaged. Elsewhere nurserymen have enjoyed a good growing season, and their sympathy cannot but go out to the sufferers, but it is seriously hoped that the nurserymen and distributors will not let the home grounds of the drought areas remain barren.

Perhaps the most important issue before the nursery trade this year was the national marketing agreement. Since July, 1933, the national planning committee, composed of five outstanding and faithful nurserymen of the United States, has worked faithfully and untiringly with officials in Washington, trying to arrive at a satisfactory agreement to satisfy you—as well as every member of the trade.

At New York city this summer, the marketing agreement was presented before those attending the nurserymen's national convention, and a public hearing with the government officials was held, in order that they might determine the trade's satisfaction with the agreement.

With the testimony given, pro and con, before this hearing, the officials, in my mind, must have determined the need for an agreement. As soon as the revised agreement is prepared, I understand it will be mailed out to nurserymen. If you desire to receive the benefits of this agreement, let me suggest that you sign and return the agreement to Washington as soon as you receive your copy.

It was stated by the government officials holding the hearing in New York city that the A. A. A. would determine the need of an agreement by the number of returned signed agreements received. This does not mean that everyone will have to sign the agreement before it becomes effective, but when the Department of Agriculture determines that enough nurserymen want it to justify the enforcement of the agreement, it will become effective, and other nurserymen can be licensed to comply.

What a Marketing Agreement Means.

Of this agreement, I have made a thorough and complete study and heard arguments both for and against, and I highly recommend the justice with which it is offered. The sum and substance of the agreement is to conduct a legal, honest business, dealing with those from whom you buy in an honest way, giving the public a square deal and letting your competitors know what you are doing. This plan is nothing more than the honest nurserymen have been doing for years—publishing a price list and then following the prices, terms and conditions. This holds no points of destruction for the already fair-dealing established firms.

Considering the benefits that have already been derived from the operation of the coöperative minimum prices and fair practices in the southwestern territory, it is urged that every nurseryman, whether large or small, whole-heartedly support this national marketing agreement in the effort to effect a gradual and increased upturn in prices of nursery stock. For the section, the minimum has helped to increase the prices—if in a small way benefits are noted, what can be expected from a national agreement?

W. C. Griffing.

The Current Season

W. N. Craig's Notes from New England

FALL BUSINESS IMPROVING.

The long looked-for rains arrived during the second week in September and were more than welcome after the series of dribbles through the summer. Planting, which was going on slowly, has now improved wonderfully, and it looks as though the season will be a good one. Evergreens, especially broad-leaved ones, are selling well, with rhododendrons and kalmias the leaders. Other evergreens are going better than had been anticipated. There are still absurdly cheap offerings of various thujas, chamæcyparis, Douglas firs, pines, certain junipers and some other heavily overstocked lines, which growers are anxious to clear at any price rather than burn.

There is a growing disposition to plant hedges of Taxus cuspidata capitata, which, while it may cost more at the outset, is absolutely hardy, decidedly preferable to the overdone California privet and superior to arbor-vitæ, hemlock or spruce for the purpose. Trees and shrubs are better ripened than at this period a year ago.

Calls for roses for fall planting are good. Hardy perennials are in first-class demand; more of these are going to be sold this fall than in several years. The demand for the better new varieties is most encouraging. Numbers of rock plants are going out, also. The call for hardy lilies surpasses all records, showing the tremendous interest in these leaders among hardy bulbs, while it looks as though those making a specialty of what are commonly termed Dutch bulbs are going to have a fine season. Growers may well forget codes, stick to their catalogue prices and do a profitable business, using the proper publicity, of course, to let buyers know what is available.

LATE-FLOWERING SHRUBS.

Of shrubs which flower in the fall, I suppose that buddleias are more commonly grown in the trade than any other, being best treated as perennials and cut down to the ground each spring. There are several varieties, of which variabilis magnifica is easily the most popular. The newer variety, Ile de France, has much more red in its make-up, which some like and many dislike; it is distinct, to say the least about it. Alternifolia, which did not impress the writer the first year or two, was fine last June, not killing back a particle and being a perfect mass of blooms. Hanging over a pond, several large plants were especially effective.

It would be well to have a good pure white. The lovely winter-flowering asiatica, the most graceful and fragrant of the entire family, is a midwinter-blooming plant, popular with florists; a similar one which is hardy is needed. Possibly such a form may eventually be obtained in seedlings from variabilis. I have seen several remarkably fine seedlings flowering recently. One to be sent out next spring has much softer flowers than magnifica and densely flowered racemes equally large.

Caryopteris incana is an old variety formerly called mastacanthus and going under various common names, such as verbena shrub and bluebeard. Its color suggests that of the popular bedding plant, ageratum. Flowers on caryopteris were just opening the first week in September. This plant is of low stature and works admirably in the perennial border, being cut to the ground each spring.

Vitex macrophylla, with erect spikes of deeper blue flowers than caryopteris, starts to bloom early in August, persisting until October. It is increasing in favor and may be treated in the same way as caryopteris in the hardy perennial border.

Elsholtzia Stauntonii is not so much seen as its value merits; in fact, it is listed in few catalogues. It is a native of northern China and perfectly hardy in the vicinity of Boston. The flowers are lilac purple in color and are freely carried at the ends of the branches in dense one-sided spikes. The foliage has a pleasant herb-like fragrance. This is a low-growing shrub, not in flower yet (September 10) and should be more planted. Of course I have omitted mention of the althæas; they are, however about the only late-flowering shrubs the average nurseryman carries. Give customers a little more variety.

LATE-FLOWERING CLEMATIS.

Among the hardy perennials, Clematis Davidiana, better known as David's clematis and the fragrant tube clematis, is at its best during September. The blue flowers are suggestive of hyacinths. Well established plants attain a height of three to four feet, although half that altitude is as much as they usually make the first season.

Everyone knows the popular and useful C. paniculata, one of the most satisfactory and popular hardy climbers, but there are others now flowering which are interesting and attractive. C. Veitchiana has clusters of small pale yellow flowers; they are usually listed as white, but placed alongside paniculata they appear creamy yellow. Veitchiana has proved absolutely hardy and has been flowering for the past three weeks. It is nearly as rank a grower as C. paniculata.

An interesting rich yellow-flowering variety with larger flowers than Veitchiana is C. tangutica var. obtusiuscula, a rather terrifying name for a lovely plant which needs to be classed as the golden clematis to popularize it. This variety, also, was unharmed last winter and opened its first flowers at Boston early in September. As seen hanging over walls and covering the sides of houses in England, it is even more attractive when seeding than in flower. Here, I think, is a really fine climber of a color unusual in this family. It comes readily from seeds, which will produce flowering plants within eight to nine months. There are opportunities for much wider use of clematis as climbers.

SPENT HOPS FOR PLANTS.

I do not know what disposition is made of the spent hops from breweries in America, but abroad they are greatly used horticulturally. One of the most famous manures in Great Britain, probably second only to Clay's in popularity, is Wakeley's hop manure, and numerous amateurs will use nothing else. Commercially, the nurserymen are wide-awake as to the value of spent hops and enormous quantities are used for such crops as rhododendrons and clematis. Perhaps if growers were to use hops here as they are abroad there might be some stimulating influence which would check the dying off at the graft, which is common to all the large-flowered section here. At the noted Goldsworth Nursery, Woking, Surrey, England, many hundreds of tons of spent hops are used annually. The owner told the writer that these hops were laid down at his nursery at 10 shillings ($2.50) per ton and they were used in the extensive plantings of rhododendrons, mostly well worked into the soil, with some left as a light mulch. Rhododendrons there are planted closely in the nurseries, as they are at Boskoop, Holland, and their dark green color, wonderful growth and splendid root system are amazing. Growers of clematis swear by spent hops also. These spent hops should be available in the United States now.

The great bulk of hybrid rhododendrons being grown in Holland and Great Britain today is from layers rather than cuttings. The layered part is not wounded with a knife, but simply given a particular twist; it is separated with a fine mass of roots within eighteen months. Great numbers of hybrid lilacs and choice azaleas are increased by layering, also.

EARLY CHRYSANTHEMUMS.

Chrysanthemums that bloom during the summer are not much appreciated, as they look unseasonable. Now that the cooler nights are here and frost is in the offing, the subjects will be more admired. The dwarf variety with double pink flowers, which is not new and has been sold under various names, but is now called Amelia, is an early bloomer, well opened early in September.

Early Bronze, of a color which its name well describes, is another excellent variety of stocky habit with medium-size flowers, splendid for cutting and popular in the flower markets. It proves perfectly hardy and it is preferable to Mrs. Phil Page (Aladdin), which has larger flowers, but makes a scraggly plant with poor foliage unless kept well watered in dry weather. In Great Britain, Mrs. Phil Page has, for a number of years, been extremely popular as a market variety, being planted out in blocks and disbudded; it is ready to cut with 5 to 6-inch flowers from late July onward. Here it does not do so well. Yellow Page, an old variety, is really better than Mrs. Phil Page as a garden plant. Normandie and Yellow Normandie are good old varieties now in flower. By the latter part of September, many other varieties will be in bloom.

W. N. C.

THE New York State Fruit Testing Cooperative Association will hold its sixteenth annual meeting at the state experiment station, Geneva, September 20. There will be exhibits of the latest offerings of the station specialists and a tour of inspection of the station orchards and nurseries, as well as a business meeting.

POISONOUS PLANTS A HAZARD.

Dangerous in Drought.

Drought makes poisonous plants an extra hazard this year, according to a recent warning by the United States Department of Agriculture.

Regarding the best way to combat the dangers of poisonous plants, department pathologists quote, "An ounce of prevention is worth a pound of cure." But prevention is difficult at any time. Although there are hundreds of known poisonous plants, many more are suspected of being poisonous.

Listing poisonous plants is complicated by the fact that they usually are not poisonous in all stages of growth nor to all animals nor in all localities and are more dangerous some years than others, particularly in dry times. Among the plants especially dangerous in dry times is the highly poisonous prussic-acid group, which includes both wild and cultivated plants. Those most noxious by reason of their poisonous character and wide distribution are wild chokeberry and black cherry, forage sorghum, Johnson grass, Sudan grass, flax and arrow grass. One or more of these plants is found in practically every part of the United States. They may develop prussic acid when growth is interfered with in any way by drought, trampling, wilting or frosting.

The green tops of potatoes or green or sprouting potatoes, and the green vines of tomato plants affect animals. Among other common poisonous plants are cocklebur, bitterweed, death camas, larkspur, loco, lupine, milkweed, mountain laurel, ragwort, St. John's-wort, sheep laurel, water hemlock and white snakeroot.

The larkspur is poisonous but palatable and, therefore, especially dangerous. It is poisonous during the summer, but apparently causes no trouble after it has gone to seed. Some of the lupines—there are about 150 varieties throughout the United States—are usually more dangerous when seeds are well formed, although some species appear to poison at any time. Ragwort or groundsel found throughout the United States; St. John's-wort, found in fields, waste places and on hills in northern United States, and mountain laurel, found in woods and on hillsides, likewise are injurious.

The loco weed, on the plains or in some of the western mountain valleys, has had the reputation of being the most serious of all poison plants. Water hemlock, found in wet places and probably the most poisonous of all American plants, apparently is a danger only in spring when the ground is moist. On the other hand, the rayless goldenrod and white snakeroot appear to be especially poisonous in the fall.

PERENNIALS FROM SEEDS.

It seems to be a general supposition that seeds of perennials should be sown from June to August. My experience is that with few exceptions the earlier the seeds are sown the better the results will be. The exceptions are such quick-growing kinds as Shasta daisies, sweet williams, hollyhocks and a few others, which do best planted in June. Delphinium can be planted early in the spring or late in summer as soon as all the seeds have ripened. Aquilegia and delphinium seeds will not germinate well if more than a year old unless kept dry and stored in air-tight containers, preferably at a low temperature.

For seed sowing, prepare the soil in an open bed or coldframe. Sow in little furrows not over twice the depth of the seeds, cover the seeds with soil and press down with a board. Make the furrows from two to four inches apart. Water thoroughly, but not so heavily as to wash out the seeds. Water often enough to prevent drying out, as a germinating seed is quickly killed by drying. Lath shading is needed until the plants come up, after which it can be removed. Keep the weeds out and the soil stirred in the rows. Transplant, when three or four leaves appear, to nursery rows, to allow more room for development.

Extremely small seeds can often be handled to advantage in small boxes three to four inches deep. For soil a mixture of one-half sand and one-half leaf mold, screened through a wire fly screen sieve, gives good results. The tiny seeds may be scattered on the soil and pressed down with a flat piece of board. Watering can be done either by resting the bottom of the box in a pan of water, allowing it to soak up through the dirt, or by a fine spray from above. Shade, until the seeds germinate, with painted glass or with paper. These seeds must not be allowed to dry out while in process of sprouting. W. A. T.

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Herbaceous Perennials

Comments on Less Common Varieties

HOUSTONIAS.

Houstonias, or bluets, among the rock garden's choicest furnishings and equally good as a ground cover in other parts of the garden, long remained one of the difficult problems of the gardener who was interested in native plants. Well do I remember my first unsuccessful attempts at taming these elusive little bright-eyes. For awhile they seemed to delight in the sunny sandy bed I had prepared for them. And then they vanished almost overnight. Now we know that all they need is an acid soil and that they can get along without the ever-present moisture which we formerly thought was a part of their requirements.

Two of the best forms are Houstonia cærulea and H. serpyllifolia. The first makes a blue carpet all during late spring and, if rightly treated as to moisture, will bloom off and on during most of the summer. The other makes tufted growth somewhat similar to the first (smaller, though, according to my experience) and spreads rapidly into quite broad mats, bearing innumerable small blue flowers with cream-colored centers over a long period in spring. H. serpyllifolia is a native of the country from Pennsylvania to Carolina, but apparently hardy as far north as Michigan.

In sections where the plants grow naturally, they might not be profitable nursery crops; where a natural supply is not to be had, there seems every reason for adding them to our lists. Not all gardeners would agree with me when I say that these two houstonias are among the best of rock plants, though I am sure that enough to insure a profitable crop would be of that opinion.

POTENTILLA FRUTICOSA.

The shrubby potentilla, fruticosa, is a widely distributed plant extending around the world in the northern hemisphere. It is natural to find a wide variation in habits of growth and in form and color of flower in such a widely disseminated plant, so we are not surprised to find forms varying from a small creeper to a shrub four feet high. One of the best of the numerous varieties that I have seen is P. fruticosa Farreri, an Asiatic form, with leaves smaller than usually found in the species and flowers of dark yellow. Not all forms of fruticosa will bloom throughout the summer, but Farreri comes close to it, with an abundance of flowers in spring on the old wood and a succession from then onward on both new and old wood. It may be propagated from greenwood cuttings.

P. fruticosa, in its best forms, should be one of our most popular shrubs. It has about everything one could ask for, including hardiness, adaptability and beauty. Beauty varies much with the variety and its behavior in different localities, but kinds such as the one mentioned are good wherever they are placed. The adaptability of the species is apparent from its distribution in nature, which varies from the driest soil to bogs. And its geographical distribution guarantees hardiness.

ARMERIA CÆSPITOSA.

One of the brightest little jewels of the early spring garden and a plant that has only to be shown to a customer to create a sale is the true Armeria cæspitosa. In its true form the foliage cushion (a year-around ornament in itself) is not more than an inch or two thick, on which set light pink flowers of typical armeria form in such numbers as to hide the plant. Be sure, though, to get the real A. cæspitosa, because the so-called hybrids, which get up to six inches in height, though good plants in their way, cannot take the place of the true species.

This little plant, which comes to us from Spain, has been perfectly hardy in my garden for years, standing a temperature of 40 degrees below zero last winter without the loss of a leaf. It needs a thoroughly drained situation, and to secure this, I give it a soil that is about one-third gravel in a high spot in the rockery. A similar soil in an elevated frame will keep it happy. And one can afford to do a little fussing with a plant that retails for 75 cents. It is a hearty little thing, spreading its cushion of foliage slowly until it gets six or more inches across. Propagation is easy by division of the stools immediately after flowering, taking at least a small portion of the root with each rosette. The plants may also be grown from cuttings taken at the same time.

DOUGLASIAS.

From the standpoint of the garden, douglasias could easily be included in androsaces, particularly in the aretia section. This includes both the structure of the plants, which differ only in some minor characters, such as the leaves of the androsace coming from the root while the subject of our sketch has its short branches densely clothed with leaves, and in their cultural needs. The latter conditions are not easily provided in the climate of the middle west. The only successful way to grow douglasias in this section, so far as I know, is in the so-called moraine planted in a soil of sand, leaf mold and peat or sphagnum in which a generous quantity of stone chips is incorporated, with moving water always at the roots of the plants. I have done little with the family in my own work, the facts set down here coming from a friend who has been growing them (trying to grow them, he says) for a number of years.

The following American forms, all inhabitants of our western mountains, are available in seeds or plants: Douglasia dentata, violet, three to six flowers on a 3-inch stem (held by some authorities to be a form of D. nivalis); D. lævigata, rosy pink, three to seven flowers on a 2-inch stem (one of the loveliest); D. montana, rose, a single flower to each stem, which is about two inches high (said to vary in different parts of its range), and D. nivalis, soft pink in the type, three to seven flowers, which are carried an inch above the compact foliage masses. Although the douglasias are not plants for general distribution, owing to the difficulties met in their culture, they should be good items for the grower with a following of expert gardeners and they are promising plants for our next phase of rock gardening.

ACHILLEA FILIPENDULINA.

The value of Achillea filipendulina is not fully appreciated by all users of cut flowers, a fact which is apparent by its absence from many plantings. And not alone for use in the fresh state while A. filipendulina is in flower from June or July until September is it of value, but if the heads are cut after they have fully opened, they may be dried for later use. These facts, coupled with the one that A. filipendulina is not a mat-maker like A. Ptarmica and, consequently, does not require the frequent division of the latter, should make the former a favorite with users of cut flowers. The stately height of A. filipendulina of three to five feet and its neat habits appeal to amateur gardeners, too, so the plant should find wide acceptance in all phases of gardening. Like other achilleas, A. filipendulina may be readily propagated from seeds or cuttings or by division.

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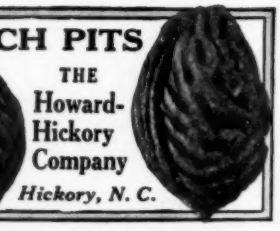

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FIGURES ON WINTER INJURY.

In New York Orchards.

The extremely low temperatures occurring in the winter of 1933-1934 caused severe winter injury to fruit trees and grapevines. To what extent other causes were contributory is not yet fully determined. The drought conditions of 1933, followed by ideal moisture conditions in late August and September, together with the coming of an early winter, may have caused new wood growth to be especially susceptible to injury. The dry spring of 1934 no doubt aggravated bad conditions.

Generally speaking, older trees were more seriously damaged than younger ones. Peaches, apples, sweet cherries and quinces suffered most severely, while pears, grapes and sour cherries suffered least. There were many variations as to the extent of the injury in different localities, while some varieties of fruits suffered much more severely than others.

The figures given in the following table are based on extensive reports made in New York state in July on the percentage of the trees killed, injured, etc., as observed by the reporters. These percentages were applied to the number of trees or vines shown by the United States census of 1930, except that in the case of apples the figures were adapted from "Estimated Numbers of Apple Trees by Varieties and Ages in Commercial and Farm Orchards in New York, January 1, 1933." "Commercial orchards" as here used mean orchards with over 100 trees and "noncommercial orchards," those with less than 100 trees. In the case of apples, trees 8 years old or younger were classed as nonbearing. It is clearly apparent that, because of this damage, the entire farming situation in many areas has been changed. Likewise, the varietal make-up of the orchards for the future will be different than in the past.

The fact that a relatively high proportion of the trees killed or injured, especially apples, consisted of trees past their economic usefulness is significant as indicating excessive killing of old or unhealthy trees.

Because the exact extent of the damage was still uncertain when the reports were made, due to the possibility, on the one hand of progressive deterioration of injured trees, or on the other hand, to a higher degree of recovery than was anticipated, these estimates are to be considered only as tentative, with the purpose of measuring the damage in approximate terms rather than with final and specific accuracy.

Trees and Vines in thousands (000 omitted)*

	Numbers of trees or vines			
	Total	Dead	Injured	Not Injured
Of bearing age:				
Apples, commercial.	6,124	1,016	1,598	3,510
Apples, noncommercial	1,697	345	456	896
Grapevines	37,206	3,512	11,247	22,507
Peaches	1,684	621	553	510
Pears	2,068	184	433	1,451
Sour cherries	772	55	135	582
Sweet cherries	104	19	28	58
Plums and prunes	455	50	97	308
Quinces	61	18	15	28
Not of bearing age:				
Apples, commercial.	2,020	74	251	1,695
Apples, noncommercial	197	23	30	144
Grapevines	1,215	79	178	957
Peaches	785	114	162	509
Pears	383	23	55	305
Sour cherries	306	11	40	256
Sweet cherries	46	8	8	30
Plums and prunes	81	8	14	59
Quinces	9	3	2	4
Selected varieties of apple trees of bearing age in commercial orchards:				
Baldwin	1,670	452	599	620
Greening	733	89	173	470
McIntosh	771	13	45	713
Wealthy	428	8	27	393
Northern Spy	338	21	49	268
Ben Davis	356	19	55	282
King	137	23	38	76
Duchess (Oldenburg)	193	8	15	170
Twenty Ounce	84	4	12	68

There are minor apparent discrepancies due to the rounding of figures to thousands.

A more detailed report, giving these data by important commercial districts and less important districts, which is entitled "Winter Damage to Fruit Trees and Grapevines, Winter of 1933-1934, A Preliminary Report," will be mailed on request to the New York agricultural experiment station, at Geneva, N. Y.

JOHN D. SIEBENTHALER, of the Siebenthaler Nurseries, Dayton, O., was recently named an honorary member of the Dayton Rose Society.

THERE was a display of nursery stock by the H. J. Zack Co., Deep River, Conn., at the recent exhibition of the Connecticut State Nature League, at the Municipal building, Middletown, Conn.

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FERTILIZING STRAWBERRIES.

The foundation for good strawberries is a soil well supplied with organic matter. This should be provided before the berries are put out, in the form of a good dressing of manure. But manure alone is seldom sufficient, as it is low in phosphoric acid and unbalanced for best plant nutrition. When it is used, fifty to seventy-five pounds of superphosphate per ton of manure, which need not be mixed with the manure, should be added also. On poor soils a complete fertilizer, in addition to the manure, has paid handsomely. A basic application of 500 to 1,000 pounds of 4-10-6 has proved effective.

Repeated demonstrations have shown that the most critical period in the life of strawberry plants is the fall before the fruit is borne. The plants must be well nourished then to develop vigorous crowns and prolific foliage capable of setting and developing a large number of berries, as the tendency of spring fertilization is to produce runners. It is especially necessary to guard against deficiency of nitrogen in the fall, though the character of growth often indicates fertilizer needs. When the foliage purples in the late summer or early fall, probably nitrogen is deficient. Nitrate of soda or sulphate of ammonia should be used in addition to the complete fertilizer to insure abundant foliage of good color. A well fertilized, thrifty strawberry plant in the fall may manufacture enough carbohydrate and store sufficient nitrogen and minerals to carry it through the fruiting season the following spring, even should a spring drought interfere with normal nutrition then.

But fertilization in the spring of the season that the fruit is borne may also be necessary. An early spring application of nitrogen, especially on soils none too fertile, may increase the number of blossoms that set berries and may make larger berries. This has sometimes considerably augmented the yield over fall fertilization alone. Where only one fertilization is practiced, the fall application is of far more importance. The best time for this treatment is August or September. A small, stunted plant cannot be made into a large, thrifty, heavy-yielding crown by spring fertilizing. The crown must be developed by fall growth.

Strawberries develop a mass of rather shallow roots, and fertilization is most effective when applied near the plants. Where the berries are grown in matted rows, the fertilizer may be distributed in the space between the rows and worked into the soil by tillage. Fertilizer should never be placed on the plants, as such an application may cause burning.

Since strawberries are not deep-rooted, they are rather sensitive to lack of water. Light and frequent irrigations give best results. Mulches to hold the moisture near the surface are helpful. Fertilizers are never effective in a dry soil. After fertilizing, the topsoil should be moistened to put the fertilizer into solution and to enable the plant to take up and assimilate the fertility thus made available. The grower who can irrigate has control of a major quality and yield factor and can produce berries that will sell at a premium.

STERILIZE GREENHOUSE SOIL.

At the end of the production season, the soil in the greenhouse is invariably infested with numerous species of rapidly multiplying insects, such as wireworms, millipedes, symphylids, sowbugs, slugs, nematodes and grubs of imported beetles. It is fatal to subsequent planting to use this soil again until the pests are effectively destroyed.

Before the greenhouse gets into production for the winter is the best time to undertake thorough soil sterilization with calcium cyanide. This "powder-gas" is effective and economical and not only completely rids the soil of insects, but also has a stimulating effect on subsequent plant growth.

The secret of success lies in systematic distribution to assure uniform penetration of the gas throughout the entire soil bed. Two methods of application are in use, the trench method and the hole method. In the first, about five ounces of calcium cyanide are used for every ten feet of trench. This is the preferred way of treating large areas of soil. The hole method is generally used in small houses and only requires dropping a teaspoonful of the sterilizing agent in each hole, the holes being punched with a broom handle or similar implement every six inches over the area to be treated. Both methods are handled easily and quickly and are described in detail in the manufacturer's handbook for greenhouses and nurseries.

BELTSVILLE RESEARCH CENTER.

Secretary Wallace has formally designated the field activities at Beltsville and at Bell, Md., as the Beltsville research center of the Department of Agriculture and named Dr. E. N. Bressman as temporary director. This action brings together under one administrative head most of the field activities of the department in the vicinity of Washington. The Beltsville research center, comprising about 4,500 acres, about fifteen miles northeast of Washington, is destined to be developed as the principal experimental area under control of the department and as the largest and most completely equipped plant for the scientific study of agriculture in this country.

Already ten bureaus of the department are conducting or are definitely planning activities in this area. The new center will be organized to control the whole area and will include the plant introduction garden at Bell.

The ten bureaus now assigned to conduct work in this area are: Animal industry, plant industry, dairy industry, agricultural engineering, entomology and plant quarantine, chemistry and soils, agricultural economics, biological survey, food and drug administration and forest service. Other departments of the government also have some activities at the research center.

The department plans ultimately to relocate at Beltsville many of the activities which have been under way at the Arlington experimental farm, just south of Washington.

SPRAY FOR SPRUCE GALL.

A soap and nicotine solution, applied late in September or before the middle part of April, is recommended by the New York agricultural experiment station, Geneva, N. Y., for the control of the spruce gall aphis, to the attacks of which the popular Norway spruce is especially susceptible. It is suggested that the undersides and tips of all branches be sprayed with the mixture, made up of one pint of nicotine and five pounds of fish oil soap in 100 gallons of water, or in that proportion. Lime-sulphur, diluted at the rate of one part to eight parts of water, has also proved effective, it is said.

Laundry soap or soap chips dissolved in warm water may be substituted for the fish oil if the latter is not readily obtainable. Applications of lubricating oil emulsions or miscible oils also give good control, but there is some danger of injury to the trees from these materials if they are used too strong, especially if applied in the fall.

J. V. BAILEY, president of the Bailey Nurseries, St. Paul, Minn., is president of the Minnesota state fair board.

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Westminster Nursery, Westminster, Md.

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Nursery Tools, Leonard Full-strapped Spades, Kunde Knives and Shears. Budding and Grafting Supplies. Free 80-page wholesale catalogue illustrates 600 tools.
A. M. Leonard & Son, Piqua, Ohio.

CATALOGUES RECEIVED.

[In writing for a copy of any of the catalogues reviewed below, please mention that you saw it described in this column of The American Nurseryman.]

A. M. Leonard & Son, Piqua, O.—Fall supplement to the spring edition of "Worthwhile Flowering Shrubs." Lilacs, for specimens and for hedge use; several little known garden aristocrats in shrubs, and berried items are featured, along with peonies, eremurus and double pyrethrums in perennials.

Mount Arbor Nurseries, Shenandoah, Ia.—Catalogue of bulbous items, such as tulips, hyacinths, lilies, irises, etc., and peonies and oriental poppies.

D. Hill Nursery Co., Dundee, Ill.—Fall wholesale catalogue of evergreens exclusively, its thirty-four pages copiously illustrated and replete with useful data. The complete line offered includes many rarer forms, such as the silver junipers, in which Hill's specializes, and evergreen grafts. Prices, according to a note, are for fall, 1934, only.

Fairview Evergreen Nurseries, Fairview, Pa.—A 28-page catalogue listing a general line of nursery stock as grown by F. C. Hetz & Sons, proprietors. Evergreens, in seedling, lining-out and specimen sizes, are featured. Deciduous trees and shrubs and perennials are also offered. Views about the nursery illustrate the catalogue.

Chugai Shokubutsu Yen, Kobe, Japan—Descriptive catalogue of seeds, plants and bulbs, printed in English and priced in American currency. Lily, tree, flower and succulent seeds are included. Illustrations of alpine plants are of particular interest. A useful seed-sowing schedule appears on a forward page.

T. Sakata & Co., Yokohama, Japan—Autumn catalogue of gardening, illustrated, printed in Japanese. Bulbous items are the bright features of the cover decoration.

William N. Craig, Weymouth, Mass.—Autumn price list of hardy lilies and Dutch bulbs. This specialist in lilies grows most of the varieties he sells, according to the foreword, which contains helpful cultural suggestions. Lily seeds are also offered. Tulips, narcissi, galanthuses, irises and many others complete the list.

H. A. Hyde Co., Watsonville, Cal.—Catalogue of spring-flowering bulbs, including tulips, lilies, narcissi and irises, as well as a large miscellaneous list containing tritonias, leucojums, ixias, etc. Narcissi for the rockery are designated. Seeds of California wild flowers are also listed.

Colorado Seed Co., Denver, Colo.—Descriptive circular of four pages, illustrated completely in colors, listing tulips and miscellaneous bulbs, as well as irises, phloxes and peonies.

E. J. Snyder, West Milton, O.—Trade list of perennials and rock plants, which is, according to Mr. Snyder, the most extensive collection yet offered in the fall by the firm. Plants have developed in good condition because of desirable soil conditions, despite the season's drought, it is stated. Phlox subulata Autumn Rose, a new introduction by the firm, is said to bloom in spring and again from early September until frost, making mounds instead of mats.

Rocky Mountain Evergreen & Nursery Co., Evergreen, Colo.—Circular listing Colorado evergreens and plants native to high elevations of the Colorado Rockies. Wild flower seeds are mentioned in collections.

Henry A. Dreer, Philadelphia—Autumn catalogue of plants, shrubs and seeds, well prepared, illustrated and indexed, consisting of eighty pages and a cover. Edited in the usual careful Dreer manner and replete with novelty offerings.

H. G. Hastings Co., Atlanta, Ga.—Eighty-eighth catalogue, for fall, 1934, listing retail offers of vegetable and flower seeds, flowering shrubs, roses and bulbs.

Northbrook Gardens, Inc., Northbrook, Ill.—An alphabetical list, with tabulated descriptions, of peonies and irises. Wholesale lists are available to the trade, it is stated.

Vaughan's Seed Store, Chicago—Autumn "Book for Florists," consisting of forty pages and a cover, on the front of which appears a spike of Excelsior Column Silvery Lilac stock. The bulb situation, with its firmer prices, is reviewed as a foreword. Bulbs, flower seeds, plants, trees and shrubs and supplies are all listed in comprehensive manner.

American Bulb Co., Chicago—Wholesale price list for florists, seedsmen and nurserymen, featuring fall requirements in bulbs, flower seeds and staple accessories for the grower. Special strains of American and European introduction appear among the flower seed novelties. An effective presentation of hardy lilies decorates the back cover. A larger size than usual has been selected for the new catalogue, 9x12 inches.

Weller Nurseries Co., Holland, Mich.—An extensive descriptive price list of herbaceous perennials for rockeries, hardy borders, wall gardens and cut flowers. The stock is described as 2-year-old transplanted field-grown material. Mention is made of a scarcity of phloxes. Hardy asters and mums are well represented among other items. Azalea mollis, boxwood and Japanese maples supplement the herbaceous offers.

ABOUT INSECT LIFE.

The plant grower's attention is most often called to insect life in connection with injurious attacks on his crops. Then he is likely to become more interested in control measures than in the causes of his troubles per se. A glance below the surface of the subject, however, should disclose the close interrelation between the combative measures and the life habits of the pests that is only one interesting phase of a science that has a score of fascinating aspects.

For those who would know more about entomology, or insect lore, a revised text in highly readable form has recently been issued by P. Blakiston's Son & Co. The work, "Entomology, with Reference to Its Ecological Aspects," provides a thorough treatment of the biological side of the science. As a rule, only the commonest kinds of insects are referred to in the text as a guide to personal observation.

While trade interest may be chiefly caught by the large chapter devoted to "Insects and Their Relation to Plants," an intelligent curiosity will not stop at that point, but be led into other sections that include discussions on such matters as "Adaptive Coloration," "Insects in Relation to Other Animals," "Interrelation of Insects," "Insect Behavior" "Insect Ecology" and others. A bibliography on each topic widens the field of research.

EVERYDAY CHEMISTRY.

Those persons who like to dabble with chemicals and to make up their own formulæ will welcome the new book, "Practical Everyday Chemistry," just issued by the Chemical Publishing Co. It contains hundreds of formulæ in its 300 pages, and much descriptive matter in regard to the ways in which they are used in commercial work. The book has been put out for the low price of $2 in order to enable the average person to gain a more thorough knowledge of the subject matter than he has been able to gain without reference to high-priced technical books. The volume should prove a mine of information to the persons interested in such things or to young folks adventuring in this branch of science.

REQUESTS MATERIAL.

I am anxious to get in touch with nurserymen who grow material for roadside planting that will grow in our climate, in lots of 500 to 1,000. We have hot, dry summers and rather mild short winters, with an annual rainfall of about eighteen inches.

Pinus ponderosa is our native tree. Oregon grape, snowberry, philadelphus and some of the spiræas grow wild. We want material that will live in our sandy loam and gravelly loam after once becoming established.

Aubrey L. White, Manager,
Spokane County Council for Protection of Roadside Beauty, 310 Review building, Spokane, Wash.

WANTS DWARF APPLE TREES.

Willard H. Pearsall, Fulton Savings Bank of Kings County, 815 Flatbush avenue, Brooklyn, N. Y., is in the market for some 1 to 2-year-old dwarf apple trees grafted on Paradise stock which he may train in the espalier or cordon manner. Mr. Pearsall states he has written to at least twenty different nurseries, but none of them seems to have the stock available. He feels sure that there must be some nursery in the eastern United States that imports Paradise apple stock upon which dwarf varieties are grafted. Perhaps some nurseryman will write him direct if an item is printed in The American Nurseryman.

Charles Sizemore, Sec'y,
American Assn. of Nurserymen.

IF THE hot spring and summer bring an early winter, the planting season in gardens will be short this autumn.

Turn Stock into Cash NOW

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Shortages are appearing in some items.

The trade is looking for sources of stock.

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Announcement is hereby made by the undersigned that Harry B. Cultra and Archie J. Cultra, of Onarga, Illinois, who have been doing business under the firm name and style of Onarga Nursery Company and Morning Star Nursery Company at Onarga, Illinois, have this day dissolved partnership; and that Harry B. Cultra is retiring from the business. Archie J. Cultra is continuing the business, taking over the assets of the co-partnership, and assuming the liabilities.

Dated this 15th day of August, 1934.

HARRY B. CULTRA
ARCHIE J. CULTRA

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reviewed in this issue and any others on horticultural subjects are obtainable at the publisher's prices, at

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No one wants shrubbery discolored by dogs or obnoxious odors on the lawn. So dogs must learn to keep all four feet on the ground around your ornamentals. A little "Black Leaf 40" (1½ teaspoonfuls per gallon of water) sprayed on lower branches and around porch pillars will keep dogs away. It is harmless—but they do not like the odor. "Black Leaf 40" is an all-around insecticide. Kills insects on flowers, vegetables, fruit—lice on poultry, etc. Sold by dealers everywhere.

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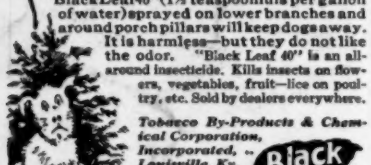

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